Regional Water Quality Control Board
Central Valley Region
Board Meeting – 17/18 March 2010
Response to Written Comments for
Aerojet- General Corporation
Groundwater Extraction and Treatment Systems
ARGET, GET E/F, GET H-A, GET J, GET K-A,
GET L-A, GET L-B, Sailor Bar Park Well, Chettenham Well,
Golden State Water Wells and Low Threat Discharges
Tentative Waste Discharge Requirements

At a public hearing scheduled for 17 and 18 March 2010, the Regional Water Quality Control Board, Central Valley Region (Regional Water Board) will consider adoption of proposed Tentative Waste Discharge Requirements (NPDES No. CA0083861) (Permit) for Aerojet- General Corporation's Groundwater Extraction and Treatment Systems, ARGET, GET E/F, GET H-A, GET J, GET K-A, GET L-A, GET L-B, Sailor Bar Park Well, Chettenham Well, Golden State Water Wells and Low Threat Discharges. This document contains responses to written comments received from interested parties in response to the proposed tentative Permit. Written comments from interested parties were required to be received by the Regional Water Board by 16 February 2010 in order to receive full consideration. Comments were received from the following entities prior by 16 February 2010:

1. Save the American River Association
2. Allen C. L. Tsao
3. East Bay Municipal Utilities District
4. Sacramento County Water Agency
5. City of Sacramento
6. United States Department of the Interior, Bureau of Reclamation

Written comments from the above interested parties are summarized below, followed by the response of the Regional Water Board staff.

Save the American River Association

1. **Comment:** We are concerned that the cumulative affect of flows reaching the American River from groundwater cleanup efforts may raise the temperature in the American River, and thus become adverse to fishery resources.

Response: A review of the temperature data collected for determining permit compliance since 1 January 2000 from up to five monitor points on the American River (over 300 temperature measurements) does not show a discernable change in temperature from upstream to downstream. In addition, even though

this permit is being opened to include the addition of three new treatment systems operating on Golden State Water Company, the maximum additional permitted flow that could occur would be 6.84 million gallons per day, and would only be for the first two months of operation of the treatment systems. After that the maximum daily flow from the three systems would be just over 1 million gallons per day and generally less, as the flow will used for potable purposes. Using that figure, there is only a 3% increase in flows that will occur under the proposed revisions. There is actually a decrease in allowed flows from the groundwater extraction and treatment systems.

Allen C.L. Tsao

2. **Comment:** Given the stated beneficial uses, the source of the water quality objective/water quality criteria for perchlorate, NDMA and other constituents listed in Table F-2 (pages F-24 and 25) do not appear to be based on the protection of aquatic life; many of them are based on protection of human health or agriculture. Protection of human health and/or agriculture does not necessarily equate to protection of aquatic biota. The WQBELS should be the lowest of all applicable uses.

Response: We agree. The values provided in Table F-2 are the most stringent of the available criteria for protection of all beneficial uses. If the value that is protective of human health is more stringent than the value that is protective of aquatic species, then the value that is protective of human health is provided in the table. Conversely, if the most restrictive value relates to protection of aquatic species, then that value is provided in the table.

3. **Comment:** I strongly recommend that the Water Board demonstrates that these numeric water quality objectives for the constituents are at levels consistent with the preservation and enhancement of fish, wildlife and other aquatic biota. In particular, perchlorate is known to elicit developmental deformities and cause adverse effects in growth in amphibians (Coleman et al, 2002). For constituents such as perchlorate, NDMA, and 1,2-dichloroethane, please provide WQBELS that are at levels protective of long-germ exposure to aquatic biota (as well as human beneficial uses).

Response: An evaluation of ecological effects of perchlorate is contained in the paper *Perchlorate: Ecological and Human Health Effects* (Clarkson, Sager, Locey, et.al.,2006). The authors summarized results of studies conducted to date including the Coleman et.al,, 2002, study listed in the comment. Potential adverse impacts on fish were found at concentrations several orders of magnitude greater than the effluent limitation of 4 µg/L found in the permit. The most conservative value found in the paper was 18 µg/L. This value was developed after assessing perchlorate's impaction on tail resorption on tadpoles. This is still greater than the 4 µg/L effluent limitation found in the permit. Concentrations in the American River would be much less given the available

dilution. We were unable to locate values for protection of aquatic life that were more stringent than those found in the permit for NDMA and 1,2-dichloroethane.

4. **Comment:** A method that approximates ambient water quality criteria has been developed and accepted by the scientific community is available from Oak Ridge National Laboratory and is provided for your consideration: http://www.esd.ornl.gov/prpgrams/ecorisk/documents/tm96r2.pdf.

Response: We will consider the recommended procedure developed by ORNL.

East Bay Municipal Utilities District (EBMUD)

5. **Comment:** EBMUD strongly supports adding the Freeport Water Agency to lthe list of downstream water purveyors in Attachment E, X., A.4.

Response: The addition has been made as requested.

6. **Comment:** Section C-1-b on page 30 of the tentative order states:". . . or the discharge is causing groundwater degradation, this order may be reopened and effluent limitations added for the subject constituents. EBMUD requests that this is changed to "surface water and groundwater" as the objectives of this NPDES permit clearly over both surface and groundwater drinking water sources.

Response: The entire Section C.1.b in the tentative permit reads "If after review of effluent monitoring results it is determined that the discharge has reasonable potential to cause or contribute to an exceedance of a water quality objective, or the discharge is causing groundwater degradation, this Order may be reopened and effluent limitations added for the subject constituents." The first part of the sentence deals with surface water impacts, while the second deals with groundwater impacts. No change was made to the tentative permit.

7. **Comment:** EBMUD is concerned about NDMA and the NDMA formation potential for its source water. We are curious to know why the effluent limits for NDMA differ from one discharge point to another. Literature has shown that NDMA forms in the water treatmne processes and chloraminated distribution system. We are concerned that having effluent limits above PHG for NDMA can reduce the ability of water utilites to address NDMA in its system. As NDMA is a recently discovered drinking water contaminant of concern, we have not fully investigated this issue, but we are concerned about the possible NDMA re-formation potential of Aerojet's discharges. We recommend potential future findings on this issue be taken into consideration in the Tentative Permit.

Response: The original two treatment systems covered under the permit are for the American River Study Area (ARGET) and GET E/F. Those systems were built using the technology that was available at the time and the NDMA removal technology is very expensive to operate and maintain. Subsequently, Aerojet

conducted several studies looking at the efficiency of treatment for removal of NDMA at the GET J facility. The studies showed that there is a significant reduction in treatment efficiency below a concentration of 0.01 µg/L, and even less efficiency below 0.007 µg/L. It was estimated that there would be approximately $50 million in increased costs (30-year net present worth) to reduce the effluent from 0.010 µg/l to 0.002 µg/L, assuming power cost per kilowatt/hour remained constant. Aerojet's study concluded that treating to 0.007 µg/L was both technically achievable and cost-effective for GET J and future GETs using the low-watt UV technology to remove NDMA from groundwater. In addition to that, the California Office of Environmental Health Hazard Assessment raised the Public Health Goal from 0.002 to 0.003 µg/L in June 2007. Therefore, the effluent limitations for GETs J, K-A, L-A and L-B were set at 0.007 µg/L. This would require less than a 2:1 dilution in the receiving water (American River) where there is generally at least a 23:1 dilution (500 cfs flow in the river with a combined maximum flow rate from the four treatment facilities of 22 cfs.

As far as NDMA reformation issues are concerned, Aerojet performed a study that looked at NDMA reformation associated with the effluent from the GET J facility. That study found that there was very little potential for NDMA reformation.

Sacramento County Water Agency

8. **Comment:** The purpose of NPDES permits is to protect water quality and public health, bit if Drinking Water Maximum Contaminant Levels (MCLs) are the basis for clean-up levels, then the discharge limits is only meeting acceptable levels of risk in drinking water as defined by EPA. Whenever feasible, it is preferred to further reduce the risk to public health by using California Public Health Goals and EPA Maximum Contaminant Level Goals (MCLGs) where appropriate. In the event remediated groundwater is used for drinking water purposes, treating to the to the MCLG level is consistent with California Department of Public Health's Policy Memo 97-005, "Policy Guidance for Direct Domestic Use of Extremely Impaired Sources."

Response: MCLs are only one of the criteria that are used in establishing effluent limitations as PHGs and other criteria are also considered. As an example, the effluent limitations for volatile organics are lower than MCLs and nearly all PHGs as Best Available Technology achieves a non-detect concentration of 0.5 µg/L for the VOCs. See Attachment F, Section IV of the tentative permit. The effluent limitation for TCE at GET E/F is one exception to this where the combination of technologies used to treat the range of pollutants in the influent does not consistently achieve 0.5 µg/L. The TCE effluent limitation for GET E/F is 1.5 µg/L, which is below the PHG of 1.7 µg/L.

9. **Comment:** Section II.H, paragraph 3, of the Revised Permit states in part that, "New negotiations between the Discharge and Sacramento County are on-going." This sentence should be revised to read: "New negotiations between the Discharger and impacted water purveyors are on-going."

Response: The requested change has been made.

10. **Comment:** Sectiion II.H, paragraph six of the Revised Permit states that the Discharger conducted a groundwater impact analysis that was described in a report dated 12 September 2003 evaluating the impact of the remedy on the sustainable yield of the basin. According to this report, an additional 30-feet of drawdown will result from implementing the remedy. Mitigating this drawdown is through the implementation of alternatives described in the Reuse Plan. The Discharger should make every effort to work with the impacted water purveyors to ensure that an appropriate reuse plan is implemented to mitigate this drawdown. Additionally, the groundwater impact analysis should be periodically reviewed to ensure that additional unintended impacts do not occur as a result of the on-going implementation of the remedy.

Response: Comment noted. The evaluation of the remedy is appropriately conducted under the groundwater cleanup order and not under the NPDES permit. The remedy is required to be reviewed at least every five years under that process.

11. **Comment:** Please add Freeport Regional Water Authority to the list of downstream water purveyors in Attachment E, X. A.

Response: The requested change has been made.

12. **Comment:** Attachment F, Section II.B.1, should delete the reference to the County and be more general by stating that the GET H-A discharge may be changed to Boyd Station Channel in order to better accommodate reuse.

Response: The requested change has been made.

City of Sacramento

13. **Comment:** The total permitted surface water discharge in this permit is 39.09 million gallons per day (mgd) which exceeds the previous permit limit of 38.18 mgd by nearly 2.5 percent. The majority contribution goes to the American River, 33.33 mgd, which is an increase from the previous permit of 31.07 mgd (7.5 percent).

We're interested in whether the cumulative effects of the Aerojet discharges and associated potential risk to the Lower American River are considered during permit revisions. The City would like to stress the importance of limiting treated

groundwater discharges to account for actual flows in the American River or its tributaries and ensure appropriate dissipation. We recommend incorporating minimum river flows when determining suitability of increased discharges. Have the dilutions been recalculated with the potential for additional discharges from the Golden State Water Company well (AC-6) and the Chettenham Well? We look forward to discussing this topic further with you, especially in anticipation of upcoming permit revisions to incorporate the Perimeter Groundwater Operable Unit (PGOU).

Response: The potential impact on the American River was assessed using a minimum flow of 250 cfs that can very rarely occur when the river flow is reduced to work on the Fish Hatchery water intake structures and other such features. Flows rarely decrease below 1000 cfs in the American River during normal operations of the Nimbus Dam. In nearly all instances dilution in the American River is not used when setting the effluent limits. The effluent is required to meet the Water Quality Objective without dilution. There are a couple of exceptions to that statement. Those exceptions are the discharge of GET K-A and GET L-A for NDMA. The effluent is set at 0.007 µg/L - with a Water Quality Objective of 0.003 µg/L. At a minimum flow down the river of 250 cfs, there is a dilution of 62.5 to 1 for GET L-A and 42 to 1 for GET K-A - assuming those facilities are putting out at their maximum flow rates.

The additional flows you mentioned are due to the new water supply well discharges. Those discharges will only be constant during the first couple of months. Then two of the wells will only discharge for a minute or two during startup and shutdown so the regular flows from them will be minimal. The third well will be discharging more often as the well will be pumping around the clock and when the water is not needed in the distribution system, it will discharge to the storm drain. So, in reality, with the decease in total permitted flows from the GETs there will be in reality no real increase in flows to the river/creeks.

In regards to the issue on water supply wells AC-6 and Chettenham, those wells have perchlorate and the dilution in the river is not used to meet the Water Quality Objective for perchlorate. Cumulative impacts are considered when effluent limitations are established.

It is not anticipated that additional modifications to the NPDES permit will be needed for the Perimeter OU. The existing facilities have been sized to incorporate the anticipated additional flows. The only potential issue would be if the County and others decide to add existing facilities GET A, GET B and/or GET D effluents to surface waters. That does not seem likely at this time. In, fact some discharges may go away as water is redirected to other alternate end points.

14. **Comment:** The tentative revised permit indicates that if source water levels in the Chettenham Well have perchlorate less than 6 micrograms per liter (ug/L)

then treatment is not required. It is unclear from the text of the permit if the treatment unit is required to stay in place for future use in case the source water levels begin to increase again, or if Aerojet plans to remove the treatment system. We would like to have confirmation that the source would be prohibited from discharging if source water levels exceed 6 ug/L and no treatment is provided.

Response: Chettenham has been discharging for about 2 years with a treatment system to remove perchlorate. The concentrations of perchlorate have dropped from 90 µg/L in the influent to around 3 µg/L and the treatment system is still there to be used if needed. The effluent limit is 6 µg/L in this permit and Aerojet would be in violation for discharging perchlorate at a concentration above 6 µg/L. Once treatment is needed, the effluent limit reverts to 4 µg/L. Given the perchlorate concentration trends in the well and in the upgradient extraction field controlling the plume, it is unlikely that the concentrations in the well will increase and require the treatment system to be started up again.

15. **Comment:** The City acknowledges and appreciates the helpfulness and information provided by Aerojet Staff over the past several years in providing notification of NPDES permit exceedences for the Interim Groundwater Extraction and Treatment Systems. The notifications should continue to include contact to downstream water purveyors when monitoring results exceed discharge limits, if detects are found in the American River, or in case of any significant problems with the discharge or remediation activities that may affect American River water quality. This is expected to be inclusive of the new Golden State Water Company wells that are being utilized for remediation. The notification needs to occur in a timely manner to allow water diverters the ability to respond to changes in source water quality. We support inclusion of the Freeport Regional Water Authority in the notifications to the downstream water utilities.

We also request early notification or “heads up” to the downstream water utilities as soon as a significant operational or maintenance problem has occurred which affects discharge quality, in advance of availability of lab results and determination on the cause of the incident. The discharge should also be immediately ceased in cases of potential significant issues. This is essential to ensure protection of public health.

Response: The requested addition has been incorporated into the tentative permit.

United States Department of the Interior, Bureau of Reclamation

16. **Comment:** Before effluent discharges from groundwater extraction and treatment systems (GET) facilities could occur in the Alder Creek, Lake Natoma or Natomas Stilling Basin a greater level of study would need to be completed:

i.e., thermal impact study of Alder Creek and Lake Natoma and a study of the potential impacts of the discharge on the Nimbus Fish Hatchery.

Response: That statement is correct and the tentative permit requires the studies.

17. **Comment:** The GET A, GET B and GET D facilities on the inclosed map are already on Aerojet property and included in the current NPDES permit. However, if effluent were to be discharged into outfalls that lead to Lake Natoma or Alder Creek, at any time in the future, a permit revision would be required. There is no proposed change in these discharge locations included in the current permit revision.

Response: GETs A, B and D currently discharge their effluents to ground for groundwater recharge and *are not* included in this permit. The comment is correct that if those discharges were to discharge to surface water, then modification of the permit, or a new NPDES permit, would be required.

18. **Comment:** A clarification was sought regarding the effluent limitation for N-nitrosodimethylamine (NDMA) that was modified in a 2007 Resolution (No.2007-0016). You explained that the effluent limitation for NDMA for GET K-A (note: Attachment B-1 indicates GET K in error) GET L-A, and GET L-B at discharge points 007, 008 and 009, respectively, will be met through mixing and dilution of flows in the American River, at which they meet the Water Quality Based Effluent Limits (see page F-21, Attachment F, Fact Sheet).

Response: The effluent limitation for NDMA for those three facilities is 0.007 µg/L. The Water Quality Objective for NDMA is of 0.003 µg/L. A minor amount of dilution is needed to meet the Water Quality Objective in the receiving water. See response to comments 7 and 13, above.

19. **Comment:** Please note the confusion surrounding the use of the term "discharge points" in Attachment F (page F-21), and the term "outfall location" in the table on page 1. For example in the table, outfall locations 007, 008 and 009 are associated with receiving water at Sailor Bar Pond, the American River at the Natomas Stilling Basin, and Alder Creek , yet it had been previously clarified (see above) that discharge points 007, 008 and 009 correspond to GETs K-a, L-A and L-B, which discharge to the American River in the vicinity of Ancil Hoffman and Hagin Park, west of the Sunrise Bridge overcrossing of the American River. In the table, these GETs correspond to outfalls 004, 002 and 002A, respectively.

Response: Discharge points are assigned to each treatment facility and are the sampling locations used to determine compliance with effluent limitations. Outfalls are associated with locations where the discharge from the treatment facility outfalls to a surface water. See Figures B-1 and B-2 of the tentative permit that provide discharge locations and outfall locations, respectively. At

outfall locations, samples are collected upstream and downstream of the outfall point to determine compliance with receiving water limitations. There are instances where more than one effluent is discharged to a given storm drainage channel that has a single outfall to the receiving water. An example of this Outfall 004 on the American River, which includes the discharges from both GET K-A (Discharge 008) and AC-6 (Discharge 013).

20. **Comment:** Reclamation supports the proposed studies of impacts prior to authorizing discharges to Lake Natoma from Alder Creek, proposed Outfall 009 point 009 (pages 8, 32). Residence time in Lake Natoma is highly variable, and Reclamation is concerned that discharges to this highly sensitive area (for both recreation and the fish hatchery) could reconcentrate due to very high residence times.

Response: Comment noted. The permit requires the studies and actual discharges to Outfalls 008 and 009 would not occur until the permit is revised to authorize specific discharges to those outfalls.

21. **Comment:** If further studies are completed, and discharge to Alder Creek is permitted at some future date, then any discharges to Lake Natoma in violation of the permit should also be reported immediately to Reclamation (page E-18).

Response: The permit would be opened up for revision to make the change in discharge locations for the GETs prior to discharge to Alder Creek. The requested addition would be made at that time.

22. **Comment:** The fact sheet should clarify that Alder Creek is not a permitted discharge location at this time.

Response: The requested change has been made.